END SEMESTER ASSESSMENT (ESA)

B.TECH. (CSE)

IV SEMESTER

UE18CS256 – MICROPROCESSOR AND COMPUTER ARCHITECTURE LABORATORY

PROJECT REPORT ON

Automation of HOME

SUBMITTED BY

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JANUARY – MAY 2021

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ABSTRACT OF THE PROJECT

The project focuses on the automation of electric home equipments. Automation is achieved using Aurdino along with necessary sensors. The project involves electronic door lock, temperature control, movement sensors. Home security is essential for occupant's convenience and protection. This project involves to develop a low cost means of home automation system using sensors like motion sensor. PIR sensor, temperature sensor, servo motor, ultrasonic sensor, LEDs.

The working of our project is as follows:

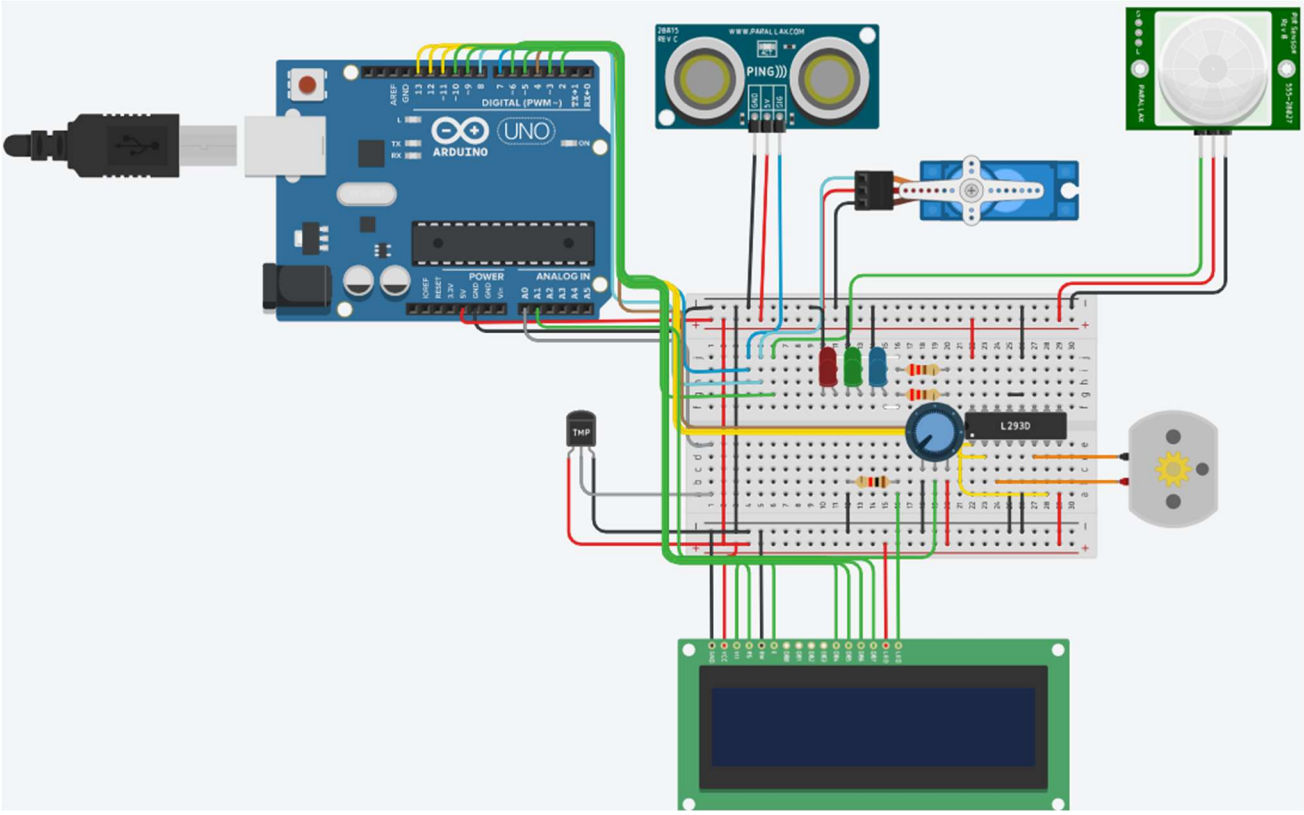
1) For this we have used an Ultrasonic Sensor for measuring the distance and the Servo motor for opening the door. The door will open for 2 seconds if any person comes near the door within 40cm range.

2) We have used a PIR Sensor for detecting movements in the room. As the PIR Sensor detects any movement LEDs will be turned on.

3) We have used a temperature sensor that detects the temperature. If the temperature detected is more than 20℃ then a fan (represented by a DC motor) starts to run.

4) The status of the 3 sensors is displayed using the LCD.

CIRCUIT DIAGRAM



Project link -

https://www.tinkercad.com/things/9cgSVvbWiKP-home-automation-system/editel?sharecode=gYVrd3A722g0_bWBc8z24gAhNGubZbUcUC3_I7X5h4w

ARDUINO CODE:

```
#include<Servo.h>
#include<LiquidCrystal.h>
LiquidCrystal lcd(A1,10,9,6,5,3);
float value;
int tmp = A0;
const int pingPin = 7;
int servoPin = 8;

Servo servo1;
void setup()
{
  Serial.begin(9600);
  servo1.attach(servoPin);
  lcd.begin(16, 2);
  pinMode(2,INPUT);
  pinMode(4,OUTPUT);
  pinMode(11,OUTPUT);
  pinMode(12,OUTPUT);
  pinMode(13,OUTPUT);
  pinMode(A0,INPUT);
  digitalWrite(2,LOW);
  digitalWrite(11,HIGH);
  digitalWrite(3,OUTPUT);
  digitalWrite(7,OUTPUT);
  digitalWrite(11,OUTPUT);
  digitalWrite(13,OUTPUT);
  }
```

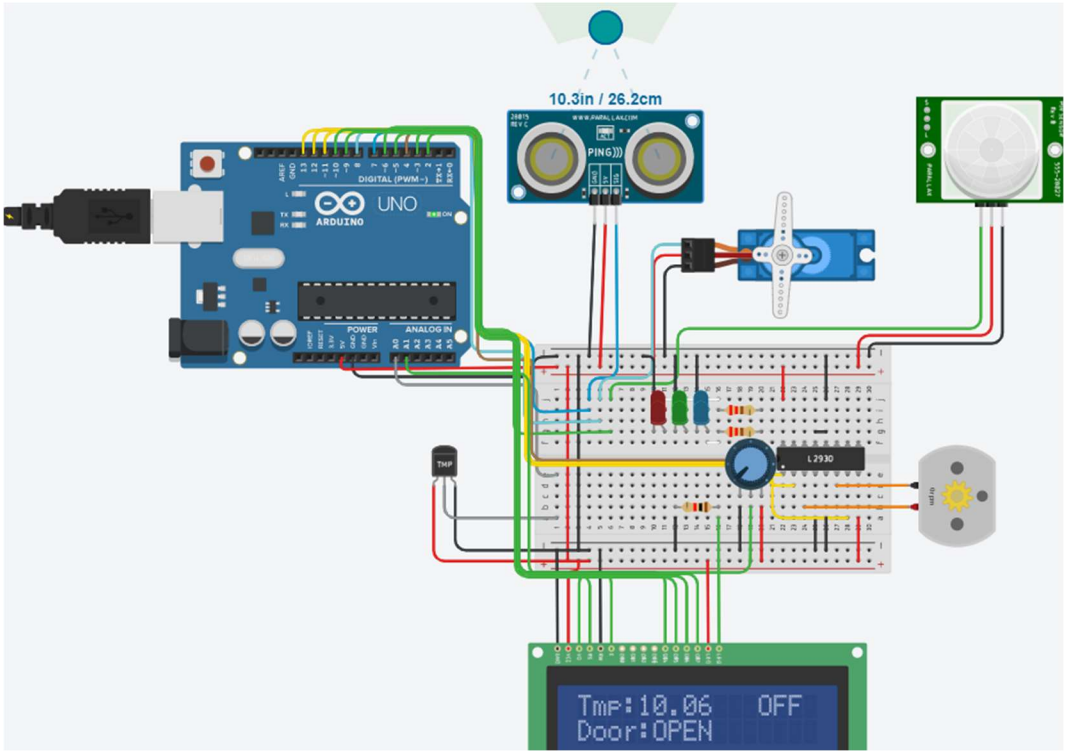
```
void loop()
{
  long duration, inches, cm;
  pinMode(pingPin, OUTPUT);
  digitalWrite(pingPin, LOW);
  delayMicroseconds(2);
  digitalWrite(pingPin, HIGH);
  delayMicroseconds(5);
  digitalWrite(pingPin, LOW);
  pinMode(pingPin, INPUT);
  duration = pulseIn(pingPin, HIGH);
  inches = microsecondsToInches(duration);
  cm = microsecondsToCentimeters(duration);
  servo1.write(0);
  if(cm < 40)
  {
   servo1.write(90);
   lcd.setCursor(0,1);
   lcd.print("Door:OPEN");
  }
  else
  {
   servo1.write(0);
   lcd.setCursor(0,1);
   lcd.print("Door:CLOSED");
  }
  int pir = digitalRead(2);
```

```
 if(pir == HIGH)
 {
   digitalWrite(4,HIGH);
   lcd.setCursor(10,0);
   lcd.print("LED:ON");
  // delay(500);
 }
 else if(pir == LOW)
    lcd.setCursor(12,0);
   lcd.print("OFF");
 {
   digitalWrite(4,LOW);
 }
value = analogRead(tmp)*0.004882814;
 value = (value - 0.5) * 100.0;
 lcd.setCursor(0,0);
        lcd.print("Tmp:");
        lcd.print(value);
        delay(1000);

Serial.println("temperature");
 Serial.println(value);

 if(value > 20)
 {
   digitalWrite(12,HIGH);
   digitalWrite(13,LOW);
 }
```

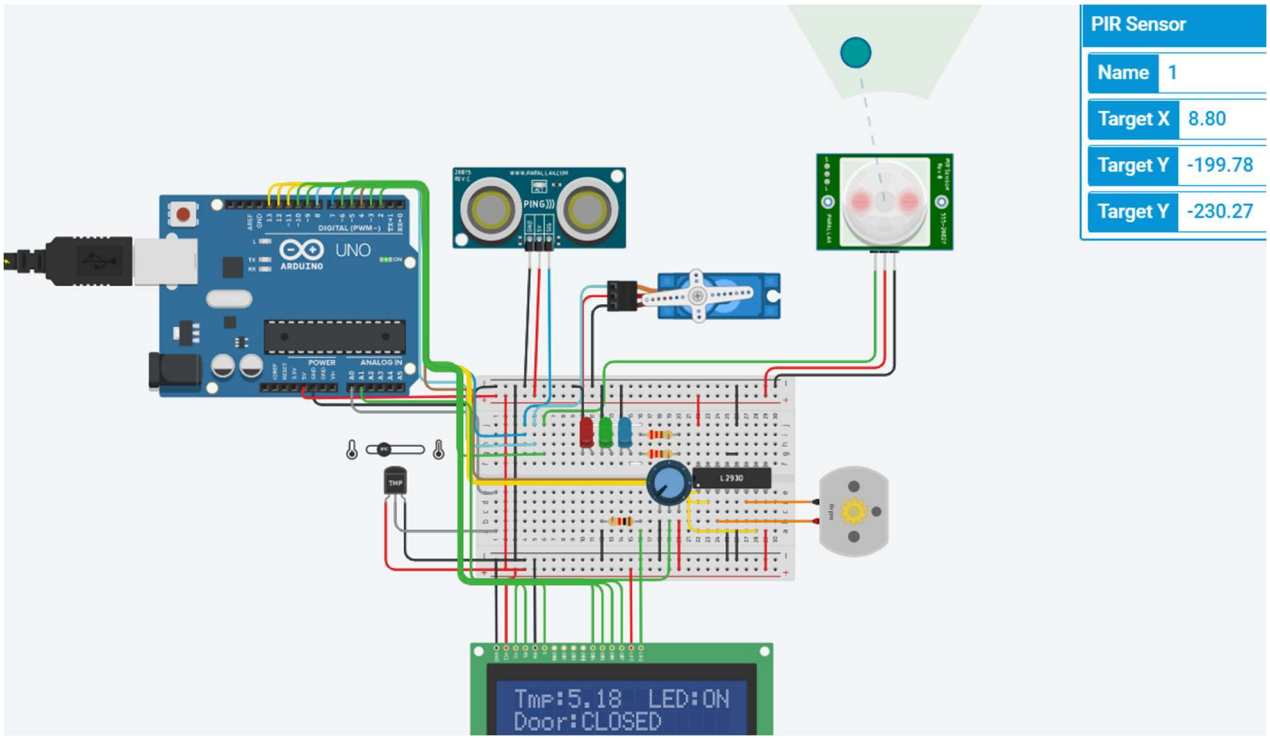
```
  else
  {
    digitalWrite(12,LOW);
    digitalWrite(13,LOW);
  }
  lcd.clear();
}

long microsecondsToInches(long microseconds) {
  return microseconds / 74 / 2;
}

long microsecondsToCentimeters(long microseconds) {
  return microseconds / 29 / 2;
}
```

SCREEN SHOTS OF THE OUTPUT:

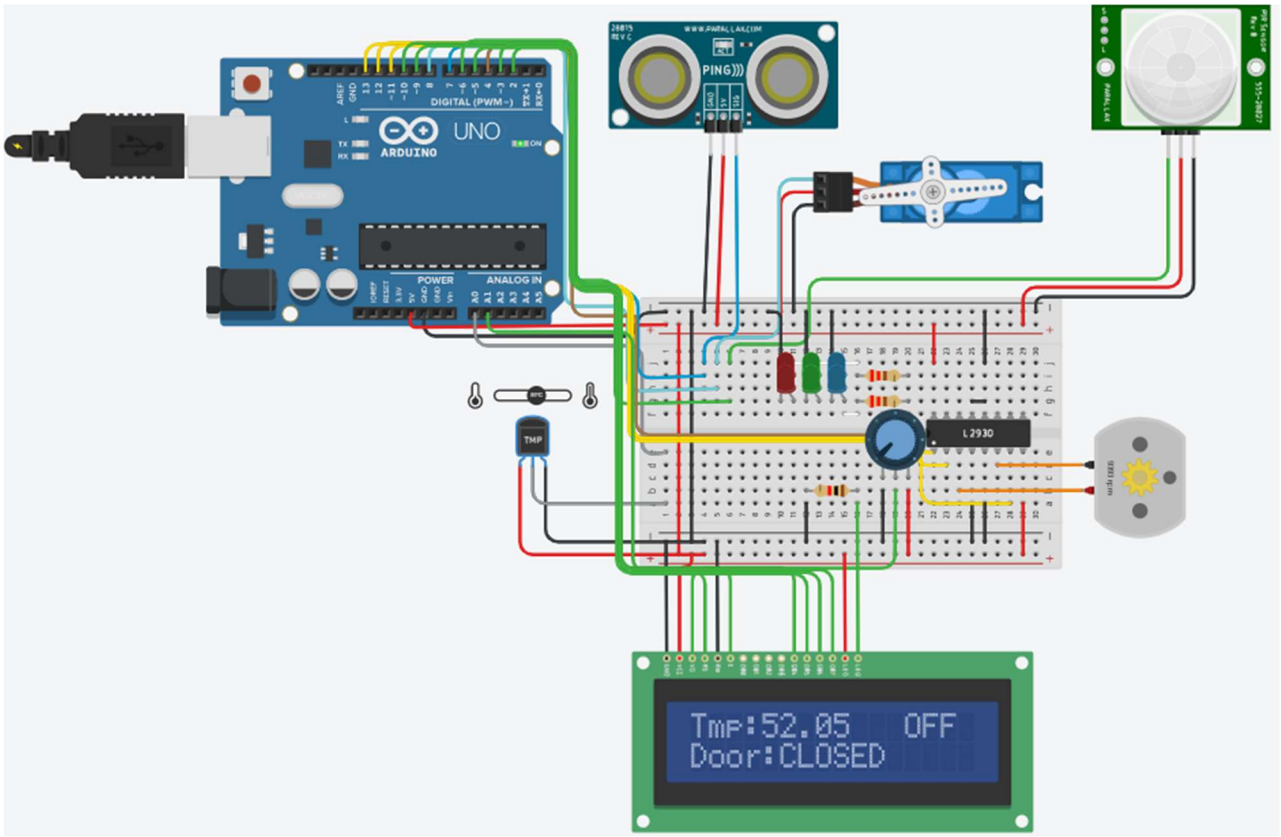
1) When anyone comes within 40cm of the door



2) If PIR detects any movement, the LEDs glow



3)If temperature sensor, detects room temperature grater than 20 C.



(The DC motor starts running, indicating the fan gets switched on.)

REFERENCES

1) https://www.youtube.com/watch?v=WSuIad9Ehd4&t=228s
2) https://www.youtube.com/watch?v=w84O5J1zt8I
3) https://www.tinkercad.com/learn/circuits